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AQUATIC MACROPHYTIC DIVERSITY IN NAVULE POND OF SHIVAMOGGA TOWN, KARNATAKA

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ABSTRACT

A total of 13 species of aquatic plants belonging to 11 families were recorded from Navule pond of Shivamogga, Karnataka during January to August 2016. Species among plant, indicative of organic enrichment as *Salvinia natans* and *Typha latifolia*. were found in large population and they were regarded as pollution tolerant aquatic macrophytes and can be used as a biological indicator for water quality. It indicates that, aquatic macrophyte species are specific to the environmental quality. The present findings revealed that the Navule pond is included under mesotrophic category.

KEYWORDS:

Physico-chemical characteristics, Aquatic macrophytes, Navule pond.

INTRODUCTION:

Wetlands are beautiful landscapes covered by water and a green mat of various types of hydrophytes. These hydrophytes are important habitat for fishes, insects, amphibians, reptiles and other wild life .Ecologically speaking, the lentic systems are important ecotones, transition between open water and land endowed with a definite structure and function to perform specific ecological balancing roles (Mahajan,1998; Srinivasa et al.,2009).

Aquatic and marshy amphibious plants are still regarded by general mass of people as 'nuisance' because they are not yet aware of the great potential and economic value of these profusely growing uncontrollable plants. These are highly productive as compared to most terrestrial crops. As a matter of fact, these plants have been proved to be good source of livestock feed, human food, fish

feed, biofertiliser, energy, fibre and paper. Furthermore, they have the capacity to purify the wastewater through the uptake of dissolved nutrients, including trace metals. Macrophytes play an important role in the ecological functioning of lentic ecosystems.

The present investigation highlights the species composition of aquatic plants found in the Navule pond of Shivamogga town, Karnataka.

MATERIALS AND METHODS

STUDY AREA

Navule pond is situated in Shivamogga city of Western Ghats, also called as the main opening of Western Ghats or Malnadu. The pond is located in Shivamogga city at an altitude of 38m from the mean sea level. Presently, the pond occupies basin of about 3.39 hectares. It is rounded in shape with a length of 200 m. The eastern and western side of the pond is occupied by peoples. The pond has a gradient towards the north-west region. The northeast part has an inlet point through which the drainage from the catchment area flows into the pond. At the Southeast region, there is an outlet point through which water overflows into large drainage.

The district is characterized by high humidity and temperature (25 - 35 °C) and heavy rainfall. The seasons can be distinctively divided as summer (pre-monsoon), rainy (monsoon) and winter (post-monsoon).

COLLECTION AND IDENTIFICATION OF AQUATIC MACROPHYTES

Present study carried out in 'Navule' pond during January to August 2016. Field trips were made once in a month covering entire the pond area with a view to find out the aquatic macrophytes species and their ecological features. In the present study monthly survey was done by quadrat method was employed by the methods of Raunkaier, (1934) and Stromberg, (1993) for collecting aquatic macrophytes. The identification of aquatic plants was done with the help of standard books and monographs like, Singh and Karthikeyan (2001), Biswas and Calder (1984). The physico-chemical parameters were estimated by referring the standard procedures of APHA (1998), Trivedi and Goel (1984) and Trivedi et al. (1998).

RESULTS AND DISCUSSION

Macrophytes are the conspicuous plants that are dominate in shallow lakes and ponds. In the present study, a total of 13 species of aquatic plants belonging to 11 families were recorded. Checklist of aquatic plants is given in Table 1. Figure 2 shows percentage occurrence of different types of macrophytes. Figure 3 depicts percentage occurrence of aquatic plants in each family. Among the aquatic plants emergent varieties are dominant with 53.85% followed by floating and submerged aquatic plants with 30.77% and 15.38% respectively. Regarding the families Nymphaeaceae and Salviniaceae consists of 2 species and rest of the families having single species each.

Figure 4 shows the physico-chemical quality of water in Navule pond. The pH of the water was slightly acidic. Dissolved oxygen content varied from 5.6 to 6.8 mg/l. While, CO₂ level fluctuated 4-8 mg/l. Chloride content ranged from 118.4 to 136 mg/l. However, calcium and magnesium levels fluctuated from 38.2-42 and 32.4-36.5 mg/l respectively. In this pond sulphate content deviated from 168 to 174 mg/l. However, TDS level was varied from 134 to 140 mg/l.

Kiran (2015) was recorded 13 species of aquatic plants belonging to 11 families from Jannapura tank of Karnataka. He opined that *Pistia stratiotes* and *Alternanthera philoxeroides* were regarded as

pollution tolerant aquatic macrophytes and be used as a biological indicator for eutrophication. It indicates that, aquatic macrophyte species are specific to the environmental quality. His findings revealed that the surface quality of the tank is productive and eutrophic.

Nagaraj Parisara et al (2017) recorded a total of 07 species of aquatic macrophytes belonging to 07 families and 06 orders from Gopashettykoppa pond of Shivamogga, Karnataka. They opined that aquatic macrophyte species are specific to the environmental quality. Their findings revealed that the surface quality of the pond is productive and mesotrophic. Ambasht (2005) recorded 25 species of macrophytes from Gujrat Tal, Jaunpur townshio North India. Kiran et al.(2006) recorded 15 species of macrophytes belonging to 13 families and grouped them under submerged (2 species), rooted floating (2 species), free floating (2 species), emergent (7 species) and marshy amphibious (2 species) from fish culture ponds of Karnataka.

Game and Salaskar (2007) recorded the macrophytes on Malchmali lakes, Thane, Maharashtra. Ramesh and Kiran (2015) reported 07 species of aquatic macrophytes belonging to five genera and five families from unused fish culture ponds at Bhadra Reservoir Project, Karnataka. The present study confirms the presence of 13 different species of aquatic macrophytes in Navule pond at Shivamogga area, Karnataka.

Navule pond supports not only grass species but also provide habitat for pollution indicator species like *Salvinia natans*. Rorslet (1991) and Murphy (2002) found that the maximum macrophytes diversity was observed in mesotrophic to slightly eutrophic lakes. Therefore, similar tendency was observed in the present water body. Grass species and *Typha* species were succeeded at a low water level and grow rapidly throughout the year. Some aquatic plants are suppressed by the dominant weed or not getting suitable environmental condition for their growth. The pond provide sufficient water for agriculture and fish culture.

CONCLUSION

In Navule pond a total of 13 species of aquatic plants were recorded. The pH of water was slightly acidic. It is observed that Navule pond water is deteriorated due to anthropogenic activity. Therefore, such activity should be stopped. Pond is loaded with silt and there is an urgent need to remove silt through appropriate technology. It is pertinent that remedial measures be formulated to conserve the plant species and preserve the biodiversity of this pond which is on the verge of extinction.

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Table 1: Different types of Aquatic macrophytes in Navule pond, Shivamogga, Karnataka

i. Emergent macrophytes:-			
Sl. No.	Scientific Name	Common Name	Family
1	<i>Alternanthera philoxiroides</i>	Alligator weed	Amaranthaceae
2	<i>Typha latifolia</i>	Broadleaf cattail	Typhaceae
3	<i>Ipomoea aquatica</i>	Water spinach	Convolvulaceae
4	<i>Neptunia oleraceaea</i>	Water mimosa	Fabaceae
5	<i>Ludwigia sp.</i>	Water primose	Onagraceae
6	<i>Nymphaea nouchali</i>	Blue lotus	Nymphaeaceae
7	<i>Bergia capensis</i>	Water wort	Elatinaceae
ii. Floating macrophytes:-			
8	<i>Salvinia natans</i>	Water butterfly wings	Salviniaceae
9	<i>Nymphaea stellata</i>	Blue lotus	Nymphaeaceae
10	<i>Eicchornia crassipes</i>	Water hyacinth	Pontederiacaceae
11	<i>Azolla pinnata</i>	Mosquito fem	Salviniaceae
iii. Submerged macrophytes:-			
12	<i>Utricularia vulgaris</i>	Neerugulle	Lentibulariaceae
13	<i>Najas minor</i>	Najas	Hydrocharitaceae



Typha latifolia



Neptunia oleracea



Elichornia crassipes



Ipomea aquatica



Salvinia natans



Ludwigia sp.

Figure 1: Aquatic plants in Navule pond

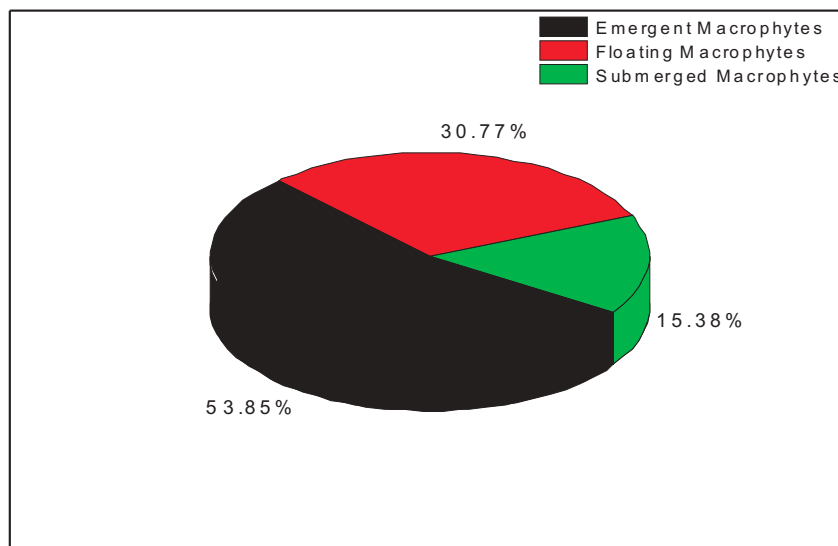


Figure 2: Percentage composition of different types of macrophytes in Navule pond, Shivamogga, Karnataka

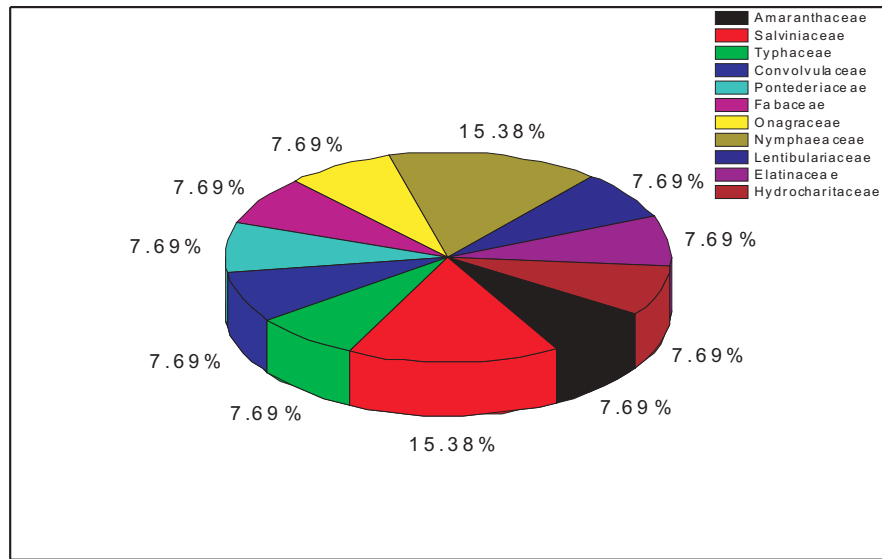


Figure 3: Each family showing percentage occurrence of macrophytes in Navule pond, Shivamogga, Karnataka

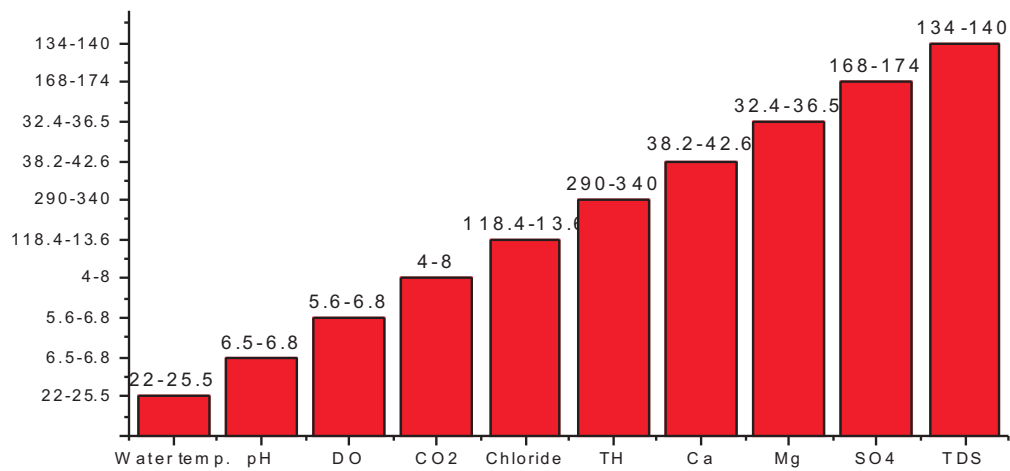


Figure 4: Range of physico-chemical parameters of water in Navule pond, Karnataka (Water temperature expressed in oC & except pH remaining parameters are expressed in mg/l)